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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/780,962	02/18/2004	Gerard Francis McLean	2269.030US1	1684

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EXAMINER

TALBOT, BRIAN K

ART UNIT	PAPER NUMBER
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1792

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/780,962	Applicant(s) MCLEAN ET AL.	
	Examiner Brian K. Talbot	Art Unit 1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 18 December 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-52 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-52 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 February 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>12/12/07 and 12/18/07</u> . | 6) <input type="checkbox"/> Other: _____ |

1. Claims 1-30 were filed in the application. Claims 31-52 have been added. Claims 1-52 remain pending in the application.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-52 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The claims are unclear as to whether the PFSI has at least two vinyl functionalities, the cross-linking agent has two vinyl functionalities or the mixture has two vinyl functionalities.

Clarification is requested.

Regarding claims 35 and 44, the term "the high boiling point solvent" lacks antecedent basis. In addition, the term "high" is vague and indefinite as it is a relative term and is unclear as to what scale the term "high" is being compared to.

Drawings

3. The drawings (Fig. 5) is objected to as failing to comply with 37 CFR 1.84(p)(4) because reference character "22" has been used to designate both a spacer and an injection port.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

6. Claims 1-4,9-14,19-23,28-34 and 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLean (6,969,563) in combination with JP '291.

McLean (6,969,563) teaches a high power density fuel cell stack using microstructured components. McLean (6,969,563) teaches a fuel plenum comprising a porous substrate communication with the plenum, a channel formed using the porous substrate wherein the channel formed comprises a first and second wall channel, forming a cathode and anode in said first and second wall channels and forming a electrolyte layer communication with said cathode and anode (col. 7, lines 15-50). An optional support member (i.e. a spacer) separates first and second channel wall (col. 8, lines (58-61). The porous substrate can be a variety of materials including graphite and a carbon cloth (col. 14, lines 39-49). The electrolyte can be a gel, liquid or a solid material and can be placed in the channels by filling (col. 15, lines 15-25).

McLean (6,969,563) fails to teach the claimed electrolyte composition including PFSI with a monomer and a cross-linking agent having at least two vinyl functionalities.

JP '291 discloses a perfluorocarbon polymer having sulfonic acid groups (e.g. a PFSI) which is mixed with at least one monomer and a divinyl benzene crosslinking agent (abstract). The PFSI above comprises sulfonic acid groups and the cross-linking agent is divinyl benzene (as applied to claims 6-8).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified McLean (6,969,563) electrolyte by substituting the electrolyte as evidenced by JP '291 with the expectation of achieving similar success.

Claims 5,15,24,38 and 47 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLean (6,969,563) in combination with JP '291 as applied above further in view of Singleton (5,425,687).

McLean (6,969,563) in combination with JP '291 fails to clearly require the presence of an initiator.

Singleton (5,425,687) is drawn to cross-linking of various ion exchange membranes wherein the mixture includes a cross-linker such as divinyl benzene (col. 5, lines 35-40). The mixture further can include an initiator (paragraph bridging columns 5 and 6).

The motivation for using an initiator would have been readily apparent to the ordinary worker in the art so as to initiate the cross-linking.

Therefore it would have been obvious to one of ordinary skill in the art at the time the claimed invention was made to modify the teachings of McLean (6,969,563) in combination with JP '291 by using an initiator since it would have provided the predictable result of initiating cross-linking. The selection of a known material based on its suitability for its intended use supported a prima facie obviousness determination in *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945) See also *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960). MPEP § 2144.07.

Claims 8,18,27,36,37,45 and 46 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLean (6,969,563) in combination with JP '291 as applied to claim 1 above further in view of Singleton (5,425,687) and Kiefer (2005/0147859).

McLean (6,969,563) in combination with JP '291 fails to teach incorporating an elasticizing vinyl monomer agent.

Singleton (5,425,687) is drawn to cross-linking of various ion exchange membranes wherein the mixture includes a cross-linker such as divinyl benzene (col. 5, ll. 35-40). The mixture further includes the presence of vinyl monomer in the mixture (col. 4, ll. 36-62).

Kiefer (2005/0147859) teaches of the desire to mix a proton conducting polymer with vinyl-containing phosphonic acids (abstract) to obtain a membrane having outstanding chemical and thermal properties. The claimed elasticizing compound is a vinyl monomer, i.e. acrylonitrile.

Since the teachings of Kiefer (2005/0147859) and Singleton (5,425,687) suggest using vinyl monomers in the mixture, there is a reasonable expectation that the combination above already having a vinyl monomer present in the mixture will function as the claimed elasticizing element absent clear evidence to the contrary and since the mixture already employs a vinyl monomer and said vinyl monomer being the same as the generically claimed and generically disclosed vinyl monomer will provide some degree of elasticity.

Claims 6,7,16,17,25,26,35,39,40,44 and 48-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over McLean (6,969,563) in combination with JP '291 as applied above further in combination with Kang et al. (6,727,024).

McLean (6,969,563) in combination with JP '291 as applied above fails to teach adding a solvent and curing the electrolyte composition by heating or electron bombardment.

Kang et al. (6,727,024) teaches a solid polymer electrolyte whereby the polymer electrolyte includes a solvent (col. 5, lines 25-67) and the electrolyte is cured by irradiation with UV, e-beam or gamma rays as well as with a heat source (col. 7, lines 54-65).

Therefore it would have been obvious for one skilled in the art at the time the invention was made to have modified McLean (6,969,563) in combination with JP '291 process by including a solvent and curing by e-beam or a heat source as evidenced by Kang et al. (6,727,024) with the expectation of achieving similar results, i.e. a cured electrolyte.


7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian K. Talbot whose telephone number is (571) 272-1428. The examiner can normally be reached on Monday-Friday 8AM-4PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Timothy H. Meeks can be reached on (571) 272-1423. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

 1/15/07
Brian K Talbot
Primary Examiner
Art Unit 1792

BKT